NATURAL RESOURCES CONSERVATION SERVICE
PACIFIC BASIN AREA
CONSERVATION PRACTICE STANDARD

WATER FACILITY, SOLAR DISTILLER

(Number)
CODE 900

DEFINITION

A device for providing fresh water from brackish, salty or otherwise impaired water using solar radiation as the primary energy input.

PURPOSE

Watering facilities for subsistence agricultural systems in order to:

- Provide for general fresh water needs of humans and livestock; and,
- Provide for general water needs of agricultural operations.

CONDITION WHERE PRACTICE APPLIES

This practice applies to all land uses where existing primary fresh water sources are insufficient in quantity and/or quality to meet the needs of the operation.

CRITERIA

General Criteria Applicable to All Purposes

All planned solar distilling facilities shall comply with Federal, state and local laws and regulations.

Casings may be made of wood, steel, iron, stainless steel, copper alloys, plastic, fiberglass, concrete or other material of equivalent strength and durability consistent with the intended use of the water. Materials containing potentially toxic materials, e.g. lead, arsenic, etc. shall not be used in the construction of the devices.

All portions of the device having contact with the final output shall be of food grade material. Generally this means glass, aluminum, stainless steel, or other materials chemically acceptable for application to surfaces and equipment that come in contact with edible products.

Each device shall be equipped with an overflow port sufficient in size to allow passing of anticipated excess water. Provisions in the design shall be made to allow flushing and cleaning of the interior of the device.

Distilled water generated from at least the first 24 hours of operation will not be used to allow for purging of gasses resulting from curing or stabilization of materials used in the construction. Sampling and testing of output from the devices shall comply with all applicable federal state and local requirements. These requirements vary with the intended use(s) of the water.

Safety of all users shall be incorporated into the design of the solar water facility. Units producing water for uses other than irrigation shall be disinfected after construction or repair prior to supplying water for consumption by humans or livestock, or other potable uses. When systems are not intended to produce potable water, the outlet of the devices will be clearly marked, “Not for Human Consumption, Non-Potable Water,” or an equivalent statement in the dominant local language.

All planned solar water facilities shall be designed to function for a period of 5 years.

Additional Criteria for Meeting General Water Needs of Humans and Livestock.

The distilling device(s) shall have the capacity to address existing or anticipated shortages of fresh water for the population being served. The capacity shall be such that sufficient water will be available to meet needs through seasonal dry periods.

Materials used in the construction of devices for supplying water needs to humans and livestock that will be in contact with input or produced water shall meet the requirements of NSF standard 61. Materials meeting this standard can be found at: www.nsf.org/Certified/PwsComponents.

Additional Criteria for Meeting General Water Needs of Agricultural Operations.

The solar distiller(s) shall have the capacity to meet the needs of the operation through seasonal dry periods. The necessary capacity will be based on available fresh water supply and the anticipated demands. Water demand may include, but is not limited to, irrigation, livestock watering, crop processing, equipment operation, etc.

CONSIDERATIONS

The siting of the solar water facility will consider solar exposure, transportation of feedstock to and fresh water from the device(s) in order to optimize operational efficiency.

The location of waste-water from the facility will consider long-term impacts of frequent discharges that are saline or contain high concentrations of minerals.

The resources available to meet all Operations and Maintenance requirements of the installed device(s), including protection of distilled water from contamination.

Access to the device(s) by livestock, wildlife, and pests will be considered in the design and siting of the facility.

If practical, the device should be located in higher ground and up grade from sources of contamination or flooding.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared for specific locations, features of the device(s) including installation details, fencing, heavy use area protection, outlet locations, pipelines for water into and out of the device(s), storage tanks, and the quality of materials to be used in the construction.

Records (inventory of needs, design computations, construction drawings, bills of materials, cost estimates, notes regarding implementation, as built drawings) supporting planning (siting), design and construction of the devices and affiliated practices shall be kept in a file at the NRCS Field Office.

OPERATION AND MAINTENANCE

A plan for the Operation and Maintenance of a solar water facility shall be prepared. The plan will include daily activities for the operation and periodic activities to address such things as growth of algae, accumulation of salts and minerals, inspection of seals, intakes, pipelines and similar features. Maintenance records (situations, actions taken) for the facility shall be kept on file with the maintenance plan by the owner/operator. As a minimum, the records shall include documentation of major cleaning (including disinfection) and repairs.

REFERENCE

1. Technical Paper #37. Understanding Solar Stills. Volunteers in Technical Assistance. 27 p. September, 1985.
2. NSF Standard 61, http://NSF.org